

REMARKS

Claims 1-19 and 22-26 are pending in the application. Claims 3, 8, 14-19, and 22-26 have been withdrawn from consideration.

Status of Claim 26

The Examiner has withdrawn claim 26 from consideration because it recites particular details about the polarizing beamsplitter, and therefore falls under non-elected invention V. Applicants note that claim 26 depends from claim 13, which the Examiner has designated is a linking claim, allowance of which will result in removal of the restriction requirement.

Rejections under 35 U.S.C. § 102

Claim 13 is rejected under 35 U.S.C. §102(b) as being anticipated by Nagashima (JP 63039394) and under 35 U.S.C. § 102(e) as being anticipated by Bryars (U.S. Patent No. 5,986,815) (Bryars '815), Bryars et al. (U.S. Patent No. 6,144,498) (Bryars '498), Kuijper (U.S. Patent No. 6,250,762 B1), and Knox (U.S. Patent No. 6,390,626 B2). These references were described in the response filed by Applicants on January 24, 2003.

The invention of claim 13 is directed to a projection system comprising a Cartesian polarizing beam splitter (PBS), the Cartesian PBS defining a first tilt axis, and a color separation prism assembly having a second tilt axis. The Cartesian PBS and the prism assembly are arranged such that the first and second tilt axes are perpendicular to each other.

It is stated in the Office Action that these five references clearly illustrate the axes of the polarizing beamsplitter and color separation prism as being perpendicular in the same manner as is illustrated in FIGs. 1b and 2b of the present application. The Examiner is respectfully requested to reconsider these rejections of claim 13, for the reasons provided in the following paragraphs. The arguments over the cited references presented in the prior response are maintained and incorporated herein, but not are re-presented in their entirety.

The following discussion makes reference to the marked up copies of FIGS. 1a, 1b, 2a, 2b and FIG. 1 from Bryars '815 that accompany this response.

In FIGs. 1a and 2a of the present application, the tilt axes (56 and 58) of the polarizing beamsplitter (PBS) and the color separation prism assembly are shown to be parallel. As a result of this structure, the central ray of the light propagates within the color prism assembly in a plane parallel to the figure of FIG. 1a. In other words, the central ray of the light reflected within the color prism assembly defines a plane parallel to the plane of the figure. The light reflected within the prism is illustrated in blue, and lies parallel to the x-z plane. The plane of the light reflected within the color prism is referred to hereafter as the prism reflection plane. It should be noted that the axes shown with Figs. 1a, 1b and 2b are consistent with the direction of light traveling in the device, even though the views look dissimilar.

The light reflected from the source to the color prism assembly via the PBS also defines a plane. The central ray of the light entering the PBS from the source, shown in red, and the central ray of the light reflected by the PBS to the color prism assembly, also shown in red, defines a plane, referred to hereafter as the PBS reflection plane. The PBS reflection plane also lies parallel to the plane of the figure, and is parallel to the x-z plane.

In the apparatus shown in FIGs. 1a and 2a of the present application, the PBS reflection plane and the PBS reflection plane are parallel. Note, that this results from the fact that the tilt axes are parallel.

Referring now to the embodiments illustrated in FIGs. 1b and 2b, the tilt axis (56) of the PBS and the tilt axis (58) of the color prism assembly are now perpendicular. The Examiner is respectfully requested to consider the resulting reflection planes. The PBS reflection plane, defined by the rays shown in red, lies parallel to the plane of FIG. 1b, i.e. parallel to the x-z plane. The prism reflection plane, however, lies perpendicular to the plane of FIG. 1b, since the prism assembly has been rotated. Accordingly, the prism reflection plane and the PBS reflection plane are perpendicular to each other. This may be more clearly illustrated with reference to FIG. 2b, in which the rays shown in red define the PBS reflection plane, parallel to the x-z plane, while the rays shown in blue define the prism reflection plane, parallel to the y-z plane.

This is a result of the fact that the tilt axes of the embodiment illustrated in FIG. 2b are perpendicular.

Thus, one way of understanding the differences between having the tilt axes parallel and the tilt axes perpendicular is that, when the tilt axes are parallel, then the prism reflection plane is parallel to the PBS reflection plane, and when the tilt axes are perpendicular, then the prism reflection plane is perpendicular to the PBS reflection plane.

The embodiments illustrated in FIGs. 1a, 1b, 2a and 2b of the present Specification may be compared to FIG. 1 from Bryars '815. In the figure from Bryars '815, the PBS reflection plane, defined by the rays marked in red, lies parallel to the plane of the figure. The prism reflection plane, defined by the rays marked in blue, also lies parallel to the plane of the figure. This corresponds to the embodiment illustrated in FIG. 1a of the present invention, in which the tilt axes are parallel, and does not correspond to the embodiment illustrated in FIG. 1b, in which the tilt axes are perpendicular.

Examination of each of the references shows systems similar to that shown in FIG. 1 from Bryars '815, i.e. the PBS reflection plane is parallel to the prism reflection plane, corresponding to the tilt axes being parallel. It is important to note that none of the cited references shows a system where the PBS reflection plane is perpendicular to the prism reflection plane. Consequently, none of the references teaches that the tilt axes of the PBS and the prism assembly are perpendicular.

Since the tilt axis of the PBS being perpendicular to the tilt axis of the prism assembly is an element of claim 13, none of the references teach all the elements of claim 13, and claim 13 is not anticipated by the references.

Applicants also disagree with the statement in the Office Action regarding the meaning of the term Cartesian polarizing beamsplitter. It is stated that Nagashima, Bryars '815, Bryars '498 and Kuijper inherently teach a Cartesian polarizing beamsplitter due to the fact that the polarizing beamsplitter splits an incident light into first and second substantially polarized beams, wherein the polarization stated thereof are inherently referenced to some co-ordinate system.

The term “Cartesian polarizing beamsplitter” was described in the previously filed response, where it is stated that a Cartesian PBS is one in which the polarization of the separate beams is referenced to invariant, generally orthogonal, principal axes of the PBS. The meaning of this definition was described. Applicants respectfully disagree with the statement that a polarizing beamsplitter is a Cartesian polarization beamsplitter simply because it produces first and second polarized beams that are inherently referenced to some co-ordinate system.

It is well known that the inventor is allowed to be his own lexicographer, so long as the assigned meaning is not repugnant to the term’s well known usage. MPEP 2111.01. Applicants respectfully suggest that the Examiner is not applying the defined meaning of the term but is applying his own meaning of the term. Evidence for this suggestion is provided in the phrase “inherently referenced to some co-ordinate system.” That is not the meaning of the phrase “Cartesian polarizing beamsplitter.” Instead, the term means that the polarization of the beams is referenced to principal material axes of the PBS itself, and not just “some co-ordinate system” (emphasis added) as asserted in the Office Action. None of Nagashima, Bryars ‘815, Bryars ‘498 and Kuijper teach that the polarization of the beams formed from the PBS is referenced to the principal axes of the PBS. The co-ordinate system defined by the term Cartesian polarizing beamsplitter is one that is tied to the principal material axes of the polarizer material itself, rather than some arbitrary set of co-ordinates as is implied in the Office Action. Accordingly, none of these references teach the use of a Cartesian PBS. If this rejection is to be maintained, the Applicants request that the Examiner provide specific evidence that these references teach that the polarization of the beams produced by the PBS is referenced to the principal material axes of the polarizer material.

As a result, Nagashima, Bryars ‘815, Bryars ‘498 and Kuijper further fail to anticipate the invention of claim 13.

Rejections under 35 U.S.C. § 103

Claims 1, 2, 4-7, and 9-12 are rejected under 35 U.S.C. § 103(a) as being unpatentable over various combinations of Nagashima, Bryars ‘815, Bryars ‘498, Kuijper

and Knox in view of Duwaer et al (U.S. Patent No. 5,146,248) (Duwaer). These were all been described in the response filed on January 24, 2003.

Three criteria must be met to establish a *prima facie* case of obviousness. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference. Second, there must be a reasonable expectation of success. Finally, the prior art reference, or combination of references, must teach or suggest all the claim limitations. MPEP § 2142. Applicants respectfully traverse the rejection since the prior art fails to disclose all the claim limitations and there would be no motivation to combine the references as proposed by the Examiner.

Applicants maintain the arguments presented against the 103 rejections in the previous response. These rejections are not re-presented here in full.

In particular, claim 1 is directed to an optical imaging system comprising, *inter alia*, a Cartesian PBS having a first tilt axis and a color separation and recombination prism having a second tilt axis perpendicular to the first tilt axis. This type of configuration has been described above with reference to claim 13, where it was shown that the cited art fails to disclose a system having the first and second tilt axes perpendicular. Instead, Nagashima, Bryars '815, Bryars '498, Kuijper and Knox only show systems in which the first and second tilt axes are parallel. Furthermore, Duwaer fails to teach any PBS, since Duwaer's system is a transmissive system, in which the image light at the different color bands is combined in a color prism. Accordingly, the proposed combinations of references fail to teach or suggest all the elements of independent claim 1.

Furthermore, Applicants respectfully suggest that there would be no reasonable expectation of success to combine the references in the manner suggested in the Office Action. Modification of the systems taught by Nagashima, Bryars '815, Bryars '498, Kuijper and Knox to include an illumination system having an f/# of f/2.5 or less would require that one of ordinary skill in the art know that a PBS capable of maintaining some acceptable level of contrast with such a low f/# was available. The problems associated with using a conventional polarizer in a projection system having an f/# of 2.5 or less were known and are discussed at length in the parent application (U.S. 09/312,917),

which is incorporated by reference in the present application. Applicants respectfully suggest that, since the problem of how to achieve a wide angle polarizer was not known to one of ordinary skill, it would not be reasonable for one of ordinary skill to combine an illumination system, as taught by Duwaer, into the systems taught by Nagashima, Bryars '815, Bryars '498, Kuijper and Knox without a suitable PBS. If this rejection is maintained, Applicants respectfully request that the Examiner provide some evidence that one of ordinary skill in the art knew, at the time the present invention was made, that such a polarizer was available.

Dependent claims 2, 4-7, and 9-12, which depend from independent claim 1 and further define the invention of independent claim 1, were also rejected under 35 U.S.C. §103(a) as being unpatentable over the same combinations of references. While Applicants do not acquiesce with the particular rejections to these dependent claims, it is believed that these rejections are moot in view of the remarks made in connection with independent claim 1. Therefore, dependent claims 2, 4-7 and 9-12 are also in condition for allowance.

In view of the reasons provided above, it is believed that all pending claims are in condition for allowance. Applicant respectfully requests favorable reconsideration and early allowance of all pending claims. Furthermore, Applicants request immediate consideration of the claims previously not considered, due to the allowability of linking claim 13.

If a telephone conference would be helpful in resolving any issues concerning this communication, please contact Applicant's attorney of record, Iain A. McIntyre at 952-253-4110.

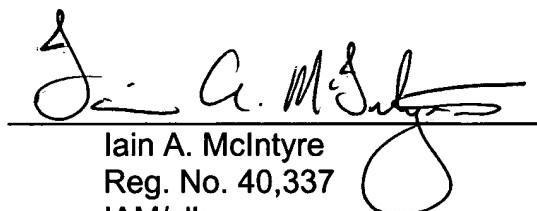
Respectfully submitted,

Altera Law Group, LLC



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By:


Iain A. McIntyre
Reg. No. 40,337
IAM/vlb

(952) 531-4719
(612) 436-9600